

Research Article

Pseudo in growing toe nail /infected toe nail fold: Introduction of a new term in big toe infection

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Abstract: Introduction: Ingrowing toenail or unguis incarnatus also known as Onychocryptosis, which is derived from Greek word *onyx* which means nail and *kryptos* which means hidden. 70% of cases occurring in people between the ages of 12-45 years. There are several different types of ingrowing nails. The most common form is distal-lateral in growing. Observations: 300 patients of toe nail infection who were treated, we found that 87 percent (261 out of 300) of these patients were actually not true in growing nails and nearly 99.61 percent (260 out of 261) of them responded to conservative management whereas the other 13 percent (39/300) patients who were true in growing toe nail i. e. 97.43 % (38 out of 39) also responded to conservative management. **Conclusion:** Infected toe nail or pseudo-ingrown toe nail should be the term used for those set of patients where there is no spicule and the granulation tissue grows from the nail fold as a result of the injury to the nail fold due to any of the reasons. So it is important to know that non-surgical treatment should be considered in the ingrowing toe nail rather than putting the patient straight to surgery unless the affected toe is heavily infected and/ or there is nail spicule projecting out of the nail pulp.

Keywords: Onychocryptosis, pseudo-ingrown toe nail, *onyx* which means nail and *kryptos* which means hidden.

INTRODUCTION

Ingrown toenail, or unguis incarnatus also known as Onychocryptosis, which is derived from Greek word *onyx* which means nail and *kryptos* which means hidden (James, W.D. *et al.*, 2006). Adolescents and young adults are affected more often than other age groups. The big toes are mainly affected, but it can occur in other digits also (Zuber, T.J., & Pfenninger, J.L. 1995). It is due to growth of the granulation tissue from lateral nail fold as a result of a nail spicule left at the corner of the nail due to wrong paring and also due to the injury to the skin of nail fold. The subsequent inflammation of the tissue results due to invasion by the virulent microbes already present there. It is a common problem with ~70% of cases occurring in between the ages of 12-45 years and causes significant discomfort, pain, pus discharge and restriction in activity (Abby, N. *et al.*, 2002).

There are several different types of ingrowing nails. The most common form is distal-lateral in growing. The aetio-pathogenesis is usually a wide nail, the distal lateral corners of which have been cut obliquely leaving a tiny spicule that digs into the lateral nail groove that finally pierces the epidermis when the nail grows forward. This causes a foreign body reaction with inflammation, granulation tissue, secondary bacterial colonization, and eventually infection (Zuber, T.J., & Pfenninger, J.L. 1995). Precipitating factors are narrow pointed shoes, tight socks, and hyperhidrosis, wearing sport shoes without rotation, juvenile diabetes mellitus, and many more (James, W.D. *et al.*, 2006).

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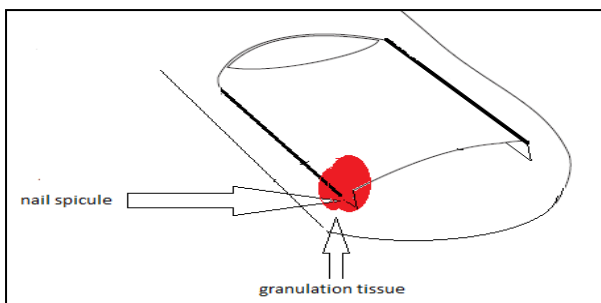


Figure No 1: Showing true in growing toe nail with nail spicule

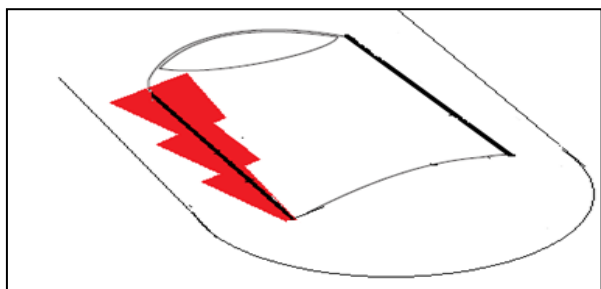


Figure No. 2: Showing Pseudo in growing toe nail with no nail spicule

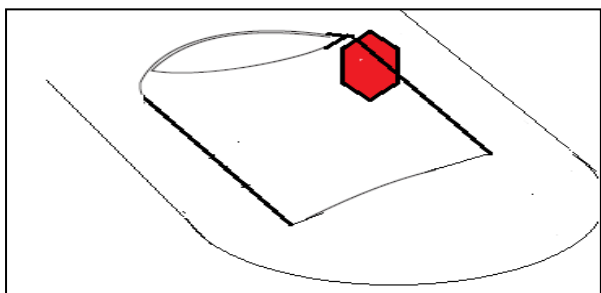


Figure No 3: Showing Pseudo in growing toe nail with no nail spicule

Heifitz (1937) divided onychocryptosis into three stages. Recently, MOZENA, J.D. (2002) refined this classification, establishing four stages

Stage I (inflammatory stage). This stage is characterized by the presence of erythema, slight edema, and pain when pressure is applied to the lateral nail fold. The nail fold does not exceed the limits of the plate.

Stage II (abscess stage). This stage is divided into two substages.

In stage IIa the pain increases and there is edema, erythema, and hyperesthesia. There may be serum drainage and infection. The nail fold exceeds the nail plate and measures less than 3 mm.

Stage IIb has symptoms similar to stage IIa. The hypertrophic fold exceeds the plate and measures more than 3 mm.

Stage III. In stage III, the symptoms worsen, with granulation tissue and chronic hypertrophy of the nail fold. The granulomatous or hypertrophic tissue largely covers the nail plate. If onychocryptosis is not properly treated, it may progress even further, resulting in serious chronic deformation of the toenail, nail folds, and distal fold.

Stage IV, which is described by Mozena is evolution of stage III, with serious chronic deformity of the toenail, both nail folds, and the distal fold. The difference between stages III and IV is the distal hypertrophy

The controversy begins already with the term: whereas most physicians call the condition ingrown or ingrowing nail (*unguis incarnatus*) since the nail plate is believed to be the cause (Haneke, E. 1986), others insist that it should be named onychocryptosis as the nail is only covered by hypertrophic lateral nail wall tissue (Murray, W. R. 1979).

Our concern is that about more than two-thirds of these ingrown nails are actually pseudoingrowing nails and all these pseudoingrowing nails have granulation tissue covered nail plates only and need conservative management only.

Management strategies vary including conservative measures for early inflammation (stage I) such as warm water soaks, topical antibiotics, and proper nail trimming techniques. Surgical procedures are reserved for ingrown toenails with infection, new periungual tissue (stage 2) or nail fold fibrosis (stage 3). Surgical techniques commonly employed are nail edge separation, wedge resection, partial or complete nail avulsion with or without matricectomy (using phenol or surgical destruction), and surgical resection of skin from the lateral aspect of the distal phalanx (Gualdi, G. *et al.*, 2014).

Elevation of the lateral nail margin and excision and cautery of the granulation tissue of the nail fold were already described by Paul Aegineta (625–690) and Abu al-Qasim, also known as Abulcasis (936–1013). Ambroise Paré (1510–1590) surgically excised it. Fabrizio ab Aquapendente (1537–1619) excised and avulsed the ingrowing nail margin. Almost 180 years ago, the chiropodist Lewis Durlaker (1792–1864) reviewed the “almost savage practices generally employed in the cure of the affections of the nails, which although of a most painful and harassing nature and which frequently lead to distressing and serious results, have been too frequently considered as holding a very humble rank in the catalogue of disease” (Dagnall, J. C. 1975). Michaelis gave a detailed description of various treatment methods as early as 1830 (Michaelis, H. S. 1830), on which Emmert later based his surgical treatment (Emmert, C. 1869). Gosselin in 1853 had

already counted 75 different varieties of local treatment and described a method, by which an elliptical wedge-shaped piece of nail matrix and skin including the whole nail groove along the edge was removed (Gosselin, L. 1873; Foote, E. M. 1899). The Bernese surgeon Emmert in 1869 and 1884 proposed a wedge excision of the lateral nail wall, groove, adjacent nail, and matrix, which is in fact the method proposed by Baudens in 1850 (Baudens, J. 1850). This is still the intervention most commonly performed by surgeons for the treatment of ingrown nails, particularly in Germany and Switzerland; here it is called Kocher's operation although Kocher had explicitly warned against this method. It was also Emmert who had first described the three stages of ingrown toenails (Emmert, C. 1869). In the late 1800s, there were more similarly radical surgical operations such as those of Hildebrandt 1884 (Rammelt, S. *et al.*, 2003). Anger's method was to cut a section of the toe from its extremity back to beyond the matrix with cuts extending to the bone (Anger, M. T. 1889). Foote wrote in 1899 that "this operation is a pretty serious one . . . No one would ever think of removing with an ingrown wisdom tooth, the overlying portion of the cheek. Yet that is exactly done to the toe in all reported methods" (Foote, E. M. 1899). He also noted that there are three ways to remove the cause, whether the nail grows down into the flesh or the flesh grows up against the nail; something may be interposed between the nail and the flesh—what is now known as packing—; the nail may be removed from the flesh; the flesh may be removed from the nail. He proposed an incision to be carried out through the nail beginning at its free end and running parallel to the ingrowing edge, through the skin and matrix to allow skin flaps overlying the matrix to be reflected. The matrix attached to the nail strip was dissected (Foote, E. M. 1899). This is in fact the first description of a selective matrix horn resection. In 1887, Qu'enu performed a radical nail bed and matrix ablation (Qu'enu, M. 1887), a method that became later known as Zadik's procedure (Zadik, F. R. 1950). The terminal Syme operation is even more radical and is in fact an amputation of the tip of the toe (Thompson, T. C., & Terwilliger, C. 1950; Rees, R. W. M. 1964).

MATERIAL AND METHODS

It was a retrospective study of 300 patients which were seen in a span of 7 years of our clinical practice. All patients when were followed up by conservative management, we observed that 87 percent (261 out of 300) of these patients were actually not true in growing nails and nearly 99.61 percent (260 out of 261) of them responded to conservative management whereas the other 13 percent (39/300) patients who were true in growing toe nail i.e. 97.43 % (38 out of 39) also responded to conservative management.

Observations:

The study included approximately 300 patients ranging from 15 years to 45 years. 13% were true in growing toe nails and 87% were pseudo-in growing.



Figure No 4: Showing true in growing toe nail



Figure No 5: Showing True in growing toe nail spicule treated with conservative treatment



Figure No 6: Showing true in growing toe nail treated with conservative treatment .The pointer shows the ingrowing nail spicule



Figure No 7: Showing Pseudo in growing toe nail



Figure No 8: Showing Pseudo in growing toe nail



Figure No 9: Showing Pseudoingrowing toe nail /infected toe nail



Figure No 10a, 10b: Showing Pseudoingrowing toe nail/infected toe nail before and after conservative management

DISCUSSION

An ingrowing nail is a common form of nail disease. It is often a painful condition where a nail grows in the adjoining skin. The true ingrowing toe nail is caused by the actual penetration of flesh of the nail pulp or nail fold by a spike of the toe nail. As the affected nail grows the spike of the nail causes aggravation of sign and symptoms. This pointed spicule of the nail acts as a foreign body and excites a foreign body reaction with hyper vascular granulation tissue. Similar reaction is excited by the injury to the skin of the nail fold due to wrong nail paring; tight pointed shoes or tight socks or when skin is soft due to hyperhidrosis or due to wearing of sports shoes continuously, the exuberant granulation over grows the normal nail edge and may even cover half of the nail plate. Clinically both the conditions resemble and look alike macroscopically. Although the cause of both the conditions is the nail yet the treatment may be sometimes different in both situations.

True ingrowing may require surgery under anaesthesia in severe type with ingrown spicule protruding from the nail pulp. Because of severe pain in true ingrowing the manipulation of conservative treatment may not be tolerated by the patient so may require surgery under anaesthesia whereas the infected toe nail fold can be treated with non-surgical treatment successfully (Abrol *et al.* 2019).

Pseudo ingrowing nails of the newborn is a known entity and 2% of the newborn babies are noted to have ingrown nails. This is because of short

growing nail plate. It is rarely painful. The appearance corrects itself within a year or so.

In adults this condition of pseudo-ingrowing toe nail is very common as per our study 87% and this condition looks like a true ingrowing toe nail clinically. This problem does not require surgical treatment like total excision of nail or partial excision of nail or partial excision of nail with phenolisation. This problem has a different cause and is different pathologically; the conservative treatment is very good and 100% fool proof without any chance of recurrence. And if at all there appears a problem in future the patient is aware of the problem so either attends the doctor early or takes care of her/his problems himself at home.

CONCLUSION

There are many controversies and many questions unanswered. The first question is to whether treat conservatively or surgically. The non-invasive methods require consistent patient compliance and experience from the side of the treating physician. Among the surgical procedures removal of the nail or hypertrophic nail fold, or sometimes both, may be carried out. Judging from the literature (Rounding, C., & Bloomfield, S. 2005) and own experience, we want to introduce a new term i.e. Infected toe nail fold or pseudo-ingrown toe nail for those set of patients where there is no nail spicule but the granulation tissue grows from nail fold over the nail plate due to nail fold injury and looks like a true ingrowing. It is important to know this variety of nail problem which can be treated conservatively with preservation of normal

anatomy especially in females who are very particular for beautification of their feet with nail paints.

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